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# Pronoun Development in Bilingual Mandarin-English Children

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# Pronoun Development in Bilingual Mandarin-English Children

**by**

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## Dedication

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# Abstract


## Pronoun Interpretation in Bilingual Mandarin-English Children

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English and Chinese monolingual children differ in pronoun interpretation: English-speaking monolingual children display Delay of Principle B (DPBE) and Quantificational Asymmetry (QA), whereas Mandarin-speaking monolingual children do not. However, it was yet unknown what bilingual Mandarin-English children's pronoun interpretation will be. The following study investigated pronoun interpretation in 13 Mandarin-English bilingual children under English and Mandarin reflexive, referential, and quantificational conditions. The specific aims were to examine 1) if bilingual Mandarin-English children displayed DPBE and QA in both English and Chinese, 2) if there were any cross-linguistic transfer of pronoun interpretation between the two languages, and 3) if there were any correlations between age and language use and the accuracy of pronoun interpretation. The results showed that Mandarin-English children did indeed display DPBE in English and no DPBE and no QA in Mandarin. There was evidence of cross-linguistic transfer in English and Mandarin Reflexive condition. Finally, age but not language use was correlated with pronoun interpretation accuracy. The study provided insight into pronoun interpretation for bilingual Mandarin-English

children and may prove to be helpful for developing an English-Mandarin language ability test.

# Table of Contents

# List of Tables

# List of Figures

# INTRODUCTION

Monolingual Mandarin-speaking and monolingual English-speaking children differ in pronoun usage and acquisition. This may be because the pronouns themselves differ between the two languages. Qi, di Biase, and Campbell (2006) and Erbaugh (1992) explained that Mandarin pronouns do not have gender, and neither do they indicate possession, unlike English pronouns that do indicate gender and possession. Not only do these two languages differ, but monolingual children also differ in their usage of pronouns. Although both Mandarin and English monolingual children use more nouns than pronouns at the early stages of language, in general Mandarin monolingual children tend to use more nouns than pronouns than English monolingual children (Qi et al., 2006). This is in part due to cultural factors, because in Chinese culture, it is acceptable that children call themselves by their own names and others by their relationships (e.g. "dad") rather than by pronouns (Qi et al., 2006). Previous research by Hao, Sheng & Gao (2014) found that English monolingual children and Chinese monolingual children differ in their displays of Delay of Principle B (DPBE) and Quantificational Asymmetry (QA) as outlined in the theory of Universal Grammar in pronoun development. These different cross-linguistic patterns lead to the question of what a bilingual Mandarin-English speaking child's pronoun usage and acquisition will be in both languages. , In this project, we set out to investigate whether or not bilingual Mandarin-English children would display DPBE and QA, and whether or not their bilingualism would lead to some cross-linguistic transfer of pronoun development.

## Separate Development Hypothesis

Two hypotheses are put forth regarding the Mandarin-English bilingual's pronoun acquisition: the Separate Development Hypothesis (De Houwer, A., 2005; Qi et al., 2006)

and the Interdependent Hypothesis (Paradis & Genessee, 1996). The Separate Development Hypothesis (De Houwer, 2005; Qi et al., 2006; Cheng & Lei, 2011) posits that bilingual children will have two separate sets of stores for the two languages from birth. These stores of languages will be "closed" and "distinct" (p. 33, De Houwer, 2005) in that there will be no influence of one language on the other. De Houwer (2005) believes that is the bilingual child will be able to generally distinguish between the features of two languages early on and be able to separate the two languages based on different usages of languages in different contexts (Qi et al., 2006). Based on this hypothesis, the development of pronouns in two languages will differ from each other.

For example, Qi et al. (2006) and Qi (2010) found that the pronoun development in one bilingual English-Mandarin child in general followed the Separate Development Hypothesis. The researchers studied the pronoun development of first-person personal pronoun, "wo", or "I", and pronouns like "mine", "I", and "me" in one bilingual English-Mandarin child who grew up in Australia. The child had parents and family members who largely spoke to him in Chinese at home, and who would occasionally speak English to him. He watched English TV shows from birth, and eventually went to an English-only daycare at 2;8 years of age. The researchers found that the bilingual child followed the Separate Development Hypothesis in that the child resembled his monolingual peers in the order of the acquisition of the English pronouns (Qi, 2010). The order of acquisition of English pronouns differs from that of Mandarin; for example, "it" in English is acquired by children earlier than "he" or "she" than in Mandarin, and indeed, the bilingual child followed the typical monolingual pattern of acquisition in that he acquired "it" earlier than acquiring "she" and "he". The child also followed the grammatical usage of the English pronoun "it" in English, not the grammatical usage of the Chinese equivalent pronoun. In addition, in support of the Separate Development Hypothesis, the

child used different approaches in learning pronouns in Mandarin and English. One aspect to note, however, is that the timing of acquisition differed than that of monolinguals. The bilingual child produced the first person pronoun "wo" ("I") in Mandarin about a year later than monolingual Mandarin-speaking children (Tseng, 1987; Hsu, 1987; Erbaugh, 1992; and Xu & Min, 1992). He also produced "I" about a year later than English speaking monolingual children at the same language level (Brown, 1973; Huxley, 1970; Clark, 1978; Chiat, 1986; and Oshima-Takane, 1992). However, the explanation for this finding is that perhaps, the child had less input of English and Mandarin than monolinguals, and therefore take longer to acquire these pronouns.

## Interdependent Hypothesis and Cross-Linguistic Transfer

According to Paradis & Genesee (1996)'s Interdependent Hypothesis, two languages will interact with each other and influence each other, so that there may be a delay, acceleration, or transfer of grammatical knowledge from one language to the other (Grosjean & Li 2012). This was supported by numerous studies (Grosjean & Li, 2012; Al Kafri, 2013). Al Kafri (2013) found that bilingual Arabic and Chinese children and adults were more accurate in determining the meaning of English reflexives that were similar to ones in Arabic or Chinese, than in determining the meaning of English reflexives that were not present in Arabic or Chinese. Al Kafri (2013) reasoned that if a similarity exists between two languages, then the L1 serves to facilitate or help the acquisition of the L2 or vice versa. Indeed, the Mandarin reflexive, "ta ziji", is very similar to the English reflexive, "herself" or "himself", in that these reflexives are both locally bound (Al Kafri, 2013). They are similar in that both reflexives refer to the most proximal or close subject or object that they are referring to.

## Evidence for Both Hypotheses

However, the description of bilingual pronoun development may not be so black and white; it may be that both of these hypotheses may hold true for different aspects of pronoun development in a bilingual child.

## Universal Grammar

One aspect of pronoun development that was yet to be explored in bilingual Mandarin-English children were Principles A and B under the Universal Grammar Hypothesis. To explain, Noam Chomsky's Universal Grammar hypothesis states that children possess an innate understanding of the principles of grammar (Chien & Wexler, 1990; Hao, Sheng, & Gao, 2014). However, not all languages share the same grammatical principles, so as children get exposed to their own specific language, children learn which specific grammatical principles that they should use and apply (Chien & Wexler, 1990). Chien & Wexler provided support for the theory of Universal Grammar by pointing out that there is no good explanation for how people can acquire so much complex and highly structured grammatical knowledge that make up a human language; at least some grammatical knowledge must be innate (Chien & Wexler, 1990). Some of the principles guiding grammar, including pronoun interpretation, include Principle A and Principle B (Chien & Wexler, 1990), and are outlined below.

### PRINCIPLE A

One of the principles of universal grammar is Binding Principle A, which is that "a reflexive must be bound in its governing category" (Chien & Wexler, 1990). Principle A states that a reflexive pronoun ("himself", "herself", "itself") refers to the antecedent in the clause in which it is contained. For example, in the sentence, "Bob says that Steve's father is pointing at himself", the reflexive "himself" refers to Steve's father, not to Bob.

Or, for example, in the sentence, “The girl sprayed herself”, “herself” refers to “the girl”, and not to another girl. To further illustrate, imagine that there is a picture of Girl A, Amber, and Girl Z, Zena. In the sentence, “Amber sprayed herself”, then “herself” refers to Amber, not to Zena.

**PRINCIPLE B**

Another principle is Binding Principle B, which is that “a pronoun must be free in its governing category” (Chien & Wexler, 1990). For example, in a sentence like “Helen says that Carol’s mother hits her”, “her” is free to refer to Helen, Carol, or another female outside of the sentence. The pronoun “her” is not bound to refer to any of the three. Basically, any referential pronoun (“him”, “her”, “it”) is free to refer to any person/thing, even outside of the clause in which it is contained (Hao et al., 2014). For example, in the sentence, “The girl sprayed her”, “her” refers to NOT the girl, but to another girl. To further illustrate, imagine that there is a picture of Girl A, Amber, and Girl Z, Zena. In the sentence, “Amber sprayed her”, “her” refers to Zena, NOT to Amber.

Note that these two principles are opposite of each other, but this does not mean that they are mutually exclusive in a language. In Universal Grammar, both can be true and whichever one is true depends on whether a reflexive (“himself”, “herself”, “itself”) or referential (“him”, “her”, “it”) pronoun is used. However, monolingual English-speaking children do not demonstrate their understanding of Principles A and B at a similar time (Hao et al., 2014). Rather, there are several things that researchers have noted about the general pattern of acquisition (Hao et al., 2014). However, there was some evidence to suggest that this is not true of children who speak other languages, like Mandarin. Various principles of grammar and their applicability to Mandarin and English are outlined below, and form the basis of this current study.

## DELAY OF PRINCIPLE B EFFECT

### Monolingual English-Speaking Children

Monolingual English-speaking children exhibit Delay of Principle B Effect (DPBE) (Hao et al., 2014; Chien & Wexler, 1990), which is, until they reach 6.6 years of age, monolingual English-speaking children often confuse pronouns (e.g. "her", "him") as reflexives (e.g. "herself" or "himself") in certain kinds of sentences like "The girl sprayed her" (Hao et al., 2014; Chien & Wexler, 1990). Children think that "her" refers to the "girl", rather than to another girl not mentioned in the sentence. For example, in a picture of Girl A, Amber, and Girl Z, Zena, children think that in the sentence "Amber sprayed her" that "her" refers to Amber, not to Zena.

There was also experimental evidence to support DPBE in English monolingual children. Chien & Wexler (1990) conducted an experiment to examine when children were able to acquire the knowledge of Binding Principle B. They tested 177 children between 2;6 and 7;0 and 20 adults. In this experiment, a picture was presented and the experimenter asked a question, and the child/adult would answer yes/no. Two different kinds of questions were tested:

1. Questions with proper names as the subject with pronouns: e.g. "Is Mama Bear pointing to her"?
2. Questions with proper names as the subject with reflexives: e.g. "Is Mama Bear pointing to herself?"

Children younger than 4 were able to accurately point to a picture of category 2, like "Is Mama Bear pointing to herself" about 30% of the time, but children from 4-5 were able to accurately point to it 67% of the time. However, when given a question in category 1, like, "This is Mama Bear. This is Goldilocks. Is Mama Bear pointing to her?"; and the picture depicted Mama Bear pointing to herself, children younger than 4

were only 30% accurate in answering the question; children between 4-5 were only 40% accurate; children between 5-6 were only 50% accurate; and children between 6-7 were 76% accurate. The researchers concluded that there was a "delay" in learning Principle B (that "her" is not bound to the most recent antecedent) compared to learning Principle A.

### Monolingual Mandarin-Speaking Children

Although this is an effect that is seen in monolingual English-speaking children, monolingual Mandarin-speaking children do not exhibit this same effect (Hao et al., 2014). Researchers Hao et al. (2014) investigated whether or not DPBE were found in Mandarin-speaking children. The researchers assessed 28 Mandarin-speaking children with a mean age of 3;5 on their Mandarin pronoun interpretation using a Picture Selection Task. In this task, the children saw two pictures. The researcher then read aloud a sentence in Mandarin and asked the child to select which picture corresponded to the sentence. They found that monolingual Mandarin-speaking children had 92% accuracy when identifying the right picture in the referential pronoun condition in Mandarin (e.g., "Look, the girl patted her"). They concluded that Chinese-speaking children did not show this delay of Principle B effect because they were generally able to understand referential pronouns in Mandarin long before 6.5 years of age, the age at which English monolingual children demonstrate understanding of pronouns in English.

## Quantificational Asymmetry

### Monolingual English-Speaking Children

However, DPBE does not always apply to English-monolingual children. Researchers have observed that monolingual English-speaking children do not exhibit DPBE when pronouns or reflexives are preceded with a quantified antecedent like "every", in the effect called Quantificational Asymmetry (QA). For example, in the

sentence, "Every girl sprayed her", English-speaking children often are able to correctly interpret the referential pronouns.

There is also experiential evidence to support QA in English monolingual children. Chien & Wexler (1990) also tested children's performance on:

3. Questions with quantified non-proper names as the subject with pronouns: e.g. "Is every bear pointing to her?"

The researchers found that in the case of #3, that children ages 5-6 were about 85.5-90% correct.

When compared to children's performance on questions with proper names as the subject with pronouns (e.g. "Is Mama Bear pointing to her"?), they did better in question type #3. They were much more accurate in identifying what the pronoun referred to when the sentence contained the quantifier "every" (e.g., "Is every bear pointing to her?") rather than without it (e.g. "Is Mama Bear pointing to her"). Therefore, monolingual English-speaking children were found to exhibit QA.

**Monolingual Mandarin-Speaking Children**

In contrast, monolingual Mandarin-speaking children do not exhibit the QA. In Hao et al.'s (2014) study, monolingual Mandarin-speaking children had 92% accuracy when identifying the right picture in the referential pronoun condition in Mandarin (e.g., "Look, the girl patted her"). The same children had 89% accuracy when identifying the right picture in the quantificational condition ("Look, every girl patted her"). There was no difference between the two conditions. Therefore, monolingual Mandarin-speaking children did not exhibit QA. In sum, unlike in monolingual English-speaking children, hearing the quantified pronoun (e.g. "Every girl sprayed her") does not boost performance over hearing the referential pronoun (e.g. "The girl sprayed her") in Mandarin-speaking children. Rather, Mandarin-speaking children showed equally high

levels of comprehension of pronouns in sentences that either included the quantified pronoun (e.g. “Every girl sprayed her”) or just the referential pronoun (e.g. “The girl sprayed her”).

### REASONS FOR EXISTENCE AND ABSENCE OF QA AND DPBE

Researchers have provided several explanations for why the DPBE and QA exists. The first is that monolingual English-speaking children have not acquired pragmatic Principle P yet (Chien & Wexler, 1990). Pragmatic Principle P states that a pronoun refers to another person in the immediate preceding context. For example, children would apply pragmatic Principle P in the following sentences:

*This is Karen.*

*She is patting her.*

They would know that “her” refers to “Karen”. They will not think that “her” refers to “she”. However, if children have not yet acquired pragmatic Principle P, they will still confuse “her” with “she”.

Another reason why DPBE might exist is that children might not have enough working memory (Grodzinsky & Reinhart, 1993; Reinhart, 2004). For example, in the previous two sentences:

*This is Karen.*

*She is patting her.*

Children need to be able to store both sentences in order to know that “her” refers to “Karen”. Remembering two sentences will take more working memory than remembering one sentence like “Karen is patting her”.

However, given that monolingual Mandarin-speaking children of comparable age do not exhibit DPBE and QA, these explanations may not be true. Hao et al. (2014) proposed instead that perhaps the reason why DPBE and QA exist is because of the form

and structural differences between Chinese and English. The topic-prominent features of the Chinese language may allow the child to more clearly distinguish between reflexives and pronouns. In Chinese, the referent or topic is often placed at the beginning of a sentence, which gives a clue as to what the pronoun is referring to. For example, a sentence like:

*Zhe ge xiao hai, ta hen ai ta.*

*This Classifier child, she really loves him.*

*This child, she really loves him.*

The referent, "this child", is placed at the beginning of the sentence in Mandarin. However, when this sentence is translated into English, the sentence becomes ungrammatical. Therefore, Hao et al. (2014) proposed that the reason why DPBE and QA do not exist in Mandarin-speaking children is that Mandarin, being a topic-prominent language, may provide children with clues of pronoun referents.

The probable explanation that language structure, rather than delayed acquisition of pragmatic skills or low working memory capacity, dictates whether or not DPBE and QA exist is further supported by the fact that DPBE and QA is present in certain languages such as Dutch, Hebrew, and Russian, but not in others, like Italian, Spanish, and Greek (Spenader, Smits, & Hendricks, 2009; Ruigendijk, Friedmann, Novogrodsky, & Balaban, 2010; Avrutin & Wexler, 1992; McKee, 1992; Baauw, Escobar, & Philip, 1997; Terzi, Marinis, & Francis, 2012). Hence, it seems more probable that features of particular languages, rather than children's pragmatic skills or working memory capacity, are responsible for these differences.

## SIGNIFICANCE OF THE RESEARCH

One reason that it was important to study pronoun development in bilingual children was because their pronoun development most probably differs from that of

monolingual children. Therefore, language assessments that are meant for monolingual children are not accurate in diagnosing bilingual children with language impairment. Determining whether or not bilingual children have a language disorder is critical in determining their need for language therapy and allowing therapy resources to be used with maximum efficiency (Dollaghan & Horner, 2010).

However, the main issue with assessing language in bilingual children is the lack of clinically useful assessments (Bedore & Pena, 2008). First, bilingual language assessments are scarce to begin with; in a survey of SLPs who assessed bilingual children with language impairment, 56.2% reported that there were no bilingual assessments available in that child's language (Williams & McLeod, 2012). Another difficulty with bilingual assessment is that English-based tests that are translated into other languages will disregard important characteristics of these other languages, if the assessment questions are based on language aspects that are only specific to English (Bedore & Pena, 2008). For example, on the Preschool Language Scale-5, an item tests whether a child can use a verb in the present tense. However, if this same test question were translated into Mandarin Chinese it would be rendered inappropriate, as there are no verb tense markings of verbs in Mandarin Chinese. Even if tests items could be translated into different languages, the child may perform better or worse on these items depending on what language they speak. For example, aspects of grammar like the present and past tense are acquired with more difficulty in English than in Spanish (Bedore & Pena, 2008). If the kind of language has an effect on children's ability to complete a certain item of the assessment, that means that children might perform better or worse depending on what kind of language exposure that they have. Currently, adequate bilingual assessment measures are sorely lacking because the normative process of bilingual language acquisition was still largely unknown. The present study aims to shed some

light into one particular aspect of normative grammatical acquisition— pronoun development in bilingual English-Mandarin children.

## Current Study

A review of the literature indicated that monolingual English-speaking children and Mandarin-speaking children show distinct patterns on tasks of pronoun comprehension. However, the question was raised as to whether or not Mandarin-English bilingual children would more closely resemble English-speaking children or Mandarin-speaking children. Would they show the DPBE and QA in English? Would they show lack of DPBE and QA in Mandarin? And if they resembled neither, what was a probable explanation for this? Additionally, would the bilingual children demonstrate any cross-linguistic transfer from one language to another? To answer this last question, it was also important to consider other factors that could have influenced the relationship between Mandarin and English pronoun usage, such as the child's age (Chien & Wexler, 1991). As children get older, it was probable that they would be more accurate in understanding pronouns that they are exposed to (Chien & Wexler, 1991). This was supported in Chien & Wexler's study (1991), that children progressively got better at demonstrating their understanding of referential pronouns as they grew older. In addition, other factors that could have influenced the relationship between Mandarin and English pronoun usage could be Mandarin/English use, or the amount that children speak a language (Weinreich, 2011; Mackey, 2000; Grosjean & Li, 2012). Hewitt et al. (2005) provides some support for this hypothesis, in that the researchers observed that one measure of use, the number of different words in a language sample of 50 utterances, was correlated to language impairment. It could be the case that the less a child knows a language and its form, the less the child will use it, and therefore the present study examined amount of language

use as a factor. Therefore in order to examine true cross-linguistic effects, it was important to possibly separate out the effect of age and language use on the accuracy of comprehending pronouns.

## Hypotheses

1. The Separate Development Hypothesis predicts that the general trend of bilingual children's pronoun usage will resemble the usage of their monolingual peers' (Qi et al., 2006; Cheng & Lei, 2011). Following this hypothesis, bilingual children would show DBPE in English but not in Mandarin, and they would show QA in English but not in Mandarin.
2. Based on the Interdependent Hypothesis (Paradis & Genessee, 1996; Grosjean & Li, 2012), there would be some cross-linguistic transfer between English and Mandarin in these children. Because English and Mandarin possess similarities in quantificational and reflexive pronouns, it was hypothesized that if a child knew quantificational terms or reflexive pronouns in one language, they would also know their equivalents in the other language (Al Kafri, 2013).
3. Age (Chien & Wexler, 1991) and Mandarin/English use (Weinreich, 2011; Mackey, 2000) would be significantly correlated to the accuracy of comprehending pronouns. As children get older, and get more input and therefore talk more in a language, the more accurate they would be in understanding pronouns. Therefore it was important to factor out age and level of language use in examining cross-linguistic effects of English and Mandarin.

# METHOD

## Participants

Thirteen bilingual Mandarin-English children (5 boys, 8 girls) between the ages 3;0 (years; months) to 5;4 participated in the study. Five children were between the ages of 3;0 and 3;11, three children were between the ages of 4;0 and 4;11, and five children were between the ages of 5;0 and 5;4. All children lived in Austin, TX when they were tested. All of the experimenters were graduate students affiliated with the Language Learning and Bilingualism Laboratory at the Department of Communication Sciences & Disorders at the University of Texas at Austin.

Similarly to Du (2014)'s study, the researchers administered a parent questionnaire (Appendix A) with instructions in both English and Mandarin in order to get a better picture of the child's background, language abilities in both languages, output, and input. Parents were specifically asked to judge their child's oral language proficiency, in the domains of vocabulary, grammar, sentence length, speech pronunciation, and listening comprehension on a five-point Likert scale (1 = low proficiency, 5 = high proficiency) for both English and Mandarin. Scores were averaged for both languages, and the children were judged to be B= bilingual if he/she had at least 20% use for English and Mandarin; E=English dominant if English use was at or exceeded 80%; and M= Mandarin dominant if Mandarin use was at or exceeded 80%. One participant who turned out to be an English-speaker only was eliminated, making the total sample size of the study thirteen. The information is presented in Table 1.

| Participant # | Age (Months) | Gender | English Input (%) | Mandarin Input (%) | English Output (%) | Mandarin output | English Experience (%) | Mandarin Experience (%) | English Proficiency | Mandarin Proficiency | Language Dominance |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 56 | F | 74 | 26 | 77 | 23 | 75.5 | 24.5 | 5 | 4.2 | B |
| 2 | 39 | M | 48 | 52 | 48 | 52 | 48 | 52 | 3.6 | 4.2 | B |
| 3 | 58 | M | 79 | 21 | 79 | 21 | 79 | 21 | 4.6 | 2.8 | B |
| 4 | 65 | F | 57 | 43 | 60 | 40 | 58.5 | 41.5 | 3.6 | 3.2 | B |
| 5 | 65 | F | 55 | 45 | 64 | 36 | 59.5 | 40.5 | 4.2 | 4 | B |
| 6 | 42 | M | 55 | 45 | 64 | 36 | 59.5 | 40.5 | 3.6 | 3.6 | B |
| 7 | 62 | F | 48 | 52 | 48 | 52 | 48 | 52 | 3.4 | 4.6 | B |
| 8 | 57 | F | 36 | 64 | 50 | 50 | 43 | 57 | 4.4 | 4.6 | B |
| 9 | 64 | F | 68 | 32 | 77 | 23 | 72.5 | 27.5 | 4.4 | 4.4 | B |
| 10 | 36 | F | 59 | 41 | 27 | 73 | 43 | 57 | 3 | 3.5 | B |
| 11 | 44 | M | 25 | 75 | 23 | 77 | 24 | 76 | 2.2 | 5 | B |
| 12 | 65 | M | 16 | 84 | 43 | 57 | 29.5 | 70.5 | 3 | 4.8 | B |
| 13 | 46 | F | 67 | 33 | 75 | 25 | 71 | 29 | 2.8 | 3.4 | B |
| Means | 53.8 | | 52.8 | 47.2 | 56.5 | 43.5 | 54.7 | 45.3 | 3.7 | 4.0 | |
| Standard Deviations | 10.9 | | 18.5 | 18.5 | 18.7 | 18.7 | 17.3 | 17.3 | 0.8 | 0.7 | |
| Mini-mum | 36 | | 16.0 | 21.0 | 23.0 | 21.0 | 24.0 | 21.0 | 2.2 | 2.8 | |
| Maxi-mum | 65 | | 79 | 84 | 79 | 77 | 79 | 76 | 5 | 5 | |

Table 1. Participant Characteristics.

## Stimuli and Procedure

The study employed a within-subject design and employed the Picture Selection task modeled from Hao et al. (2014)'s study. First, the researcher told the child that he/she was to teach a puppet either English or Chinese. Then, the researcher presented the child with two pictures on a MacBook 13" laptop on Microsoft PowerPoint. The researcher then read a sentence aloud, and the child was required to point to the picture correctly corresponding to the sentence that he/she heard. A fluent Mandarin-English bilingual researcher showed the pictures, read the sentences aloud, and recorded the child's responses.

The materials consisted of 4 warm-ups, 8 reflexive, 8 quantificational, 8 filler, and 8 referential test items in each language (see Appendix B). Warm-ups consisted of questions that allowed the child to be familiar with the basic instructions of the test. For example, for one warm-up, "Look, this is a strawberry", the child was asked to hear the sentence and then point to the picture describing that sentence out of two pictures. The child needed to successfully answer 3 warm-up questions before proceeding to the actual test. If they did not give the right answer, they were corrected and then asked the same question again to confirm that they understood what the right answer was before proceeding.

The fillers and test items under the referential condition and quantificational condition are shown in the following six figures. The filler condition was presented in the same way as the test items, but the sentences did not test the children's comprehension of pronouns. The participants were randomly assigned to either doing the Mandarin pronoun test first, or the English pronoun test first. The items were also sequenced pseudo randomly.

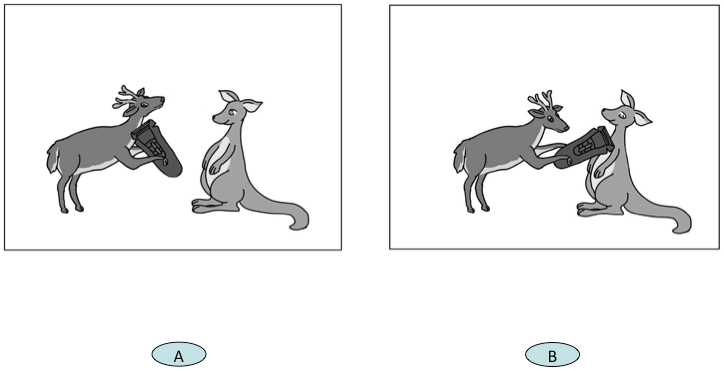


Figure 1. (B) English Filler Condition: Look, the reindeer is shaving the kangaroo.

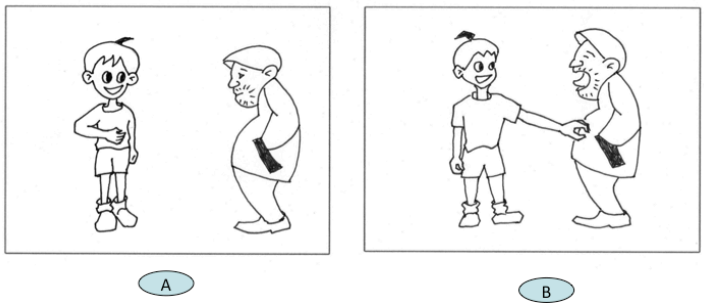


Figure 2. English Referential and Reflexive Conditions. (A) English Reflexive: Look, the boy is tickling himself. (B) English Referential: Look, the boy is tickling him.

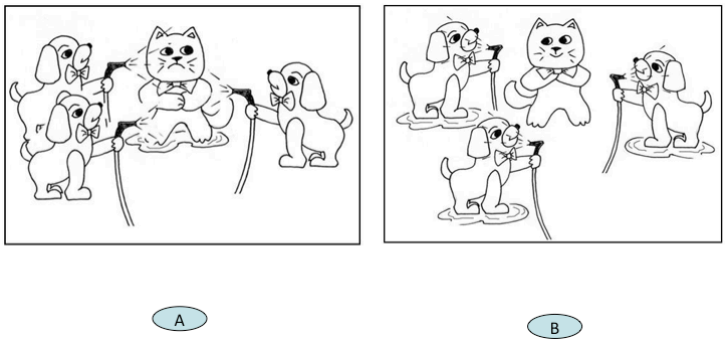


Figure 3. (A) English Quantificational Condition: Look, every dog is spraying him.

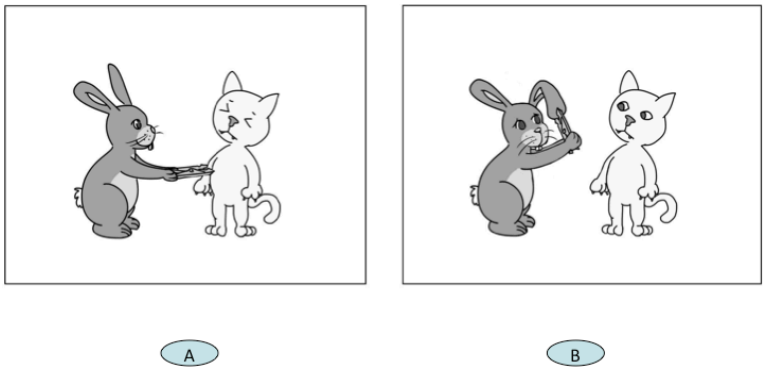


Figure 4. (A) Chinese Filler Condition: Look, the rabbit is cutting the cat. *Ni kan, xiao tu zi zai jian xiao mao*.

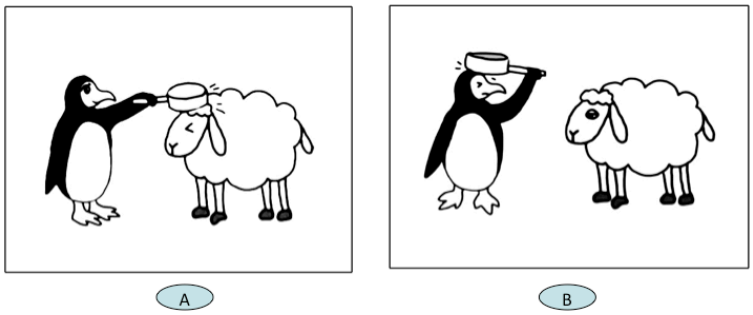


Figure 5. Chinese Referential and Reflexive conditions. (A) Chinese Referential: Look, the penguin is hitting him. *Ni kan, xiao qi e xai da ta*. (B) Chinese Reflexive: Look, the penguin is hitting himself. *Ni kan, xiao qi e zai da ta zi ji*.


Figure 6. (A) Chinese Quantificational Condition: Look, every girl is touching her. *Ni kan, mei ge xiao nu hai dou zai mo ta*.

# RESULTS

The dependent measure in the Picture Selection task was the percent of correct answers. The individual data, group means and standard deviations are presented in Table 2 below.

| Participant # | Age (Months) | English_Quantificational | English_Referential | English_Reflexive | English_Filler | Mandarin_Quantificational | Mandarin_Referential | Mandarin_Reflexive | Mandarin_Filler |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 56 | 100 | 37.5 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | 39 | 87.5 | 62.5 | 25 | 87.5 | 75 | 62.5 | 12.5 | 62.5 |
| 3 | 58 | 50 | 37.5 | 100 | 100 | 100 | 75 | 100 | 100 |
| 4 | 65 | 87.5 | 62.5 | 100 | 100 | 100 | 75 | 100 | 100 |
| 5 | 65 | 87.5 | 100 | 100 | 100 | 100 | 100 | 87.5 | 100 |
| 6 | 42 | 75 | 50 | 75 | 100 | 100 | 87.5 | 100 | 87.5 |
| 7 | 62 | 100 | 62.5 | 100 | 100 | 100 | 75 | 100 | 100 |
| 8 | 57 | 75 | 87.5 | 100 | 100 | 100 | 100 | 100 | 100 |
| 9 | 64 | 100 | 87.5 | 100 | 100 | 75 | 50 | 87.5 | 100 |
| 10 | 36 | 75 | 50 | 62.5 | 100 | 37.5 | 50 | 87.5 | 87.5 |
| 11 | 44 | 100 | 87.5 | 100 | 87.5 | 87.5 | 100 | 100 | 87.5 |
| 12 | 65 | 37.5 | 37.5 | 100 | 100 | 12.5 | 12.5 | 100 | 100 |
| 13 | 46 | 75 | 87.5 | 87.5 | 100 | 75 | 62.5 | 100 | 100 |
| Means | 53.8 | 80.8 | 65.4 | 88.5 | 98.1 | 81.7 | 81.7 | 90.4 | 94.2 |
| Standard Deviations | 10.9 | 19.5 | 22.3 | 22.5 | 4.7 | 27.8 | 27.8 | 24.0 | 10.96 |
| Minimum | 36 | 37.5 | 37.5 | 25 | 87.5 | 12.5 | 12.5 | 12.5 | 62.5 |
| Maximum | 65 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Table 2. Individual Scores, Group Means, SDs, Min, and Max Values.

## Study Question 1: *DPBE and QA*

### DPBE IN ENGLISH

A Wilcoxon Signed-Ranks Test indicated that the English Reflexive score was statistically significantly higher than the English Referential Score, $Z = 2.41$, $p < 0.2$ (Table 3). This indicated that the bilingual children show a delay in the Referential Condition relative to the Reflexive Condition, and therefore did exhibit DPBE in English.

### DPBE IN MANDARIN

A Wilcoxon Signed-Ranks Test indicated that the Mandarin Reflexive score was not statistically significantly higher than the Mandarin Referential Score, $Z = 1.58$, $p < 0.11$ (Table 3). This indicated that the bilingual children did not show a delay in the Referential Condition relative to the Reflexive Condition, and therefore did not exhibit DPBE in Mandarin.

### QA IN ENGLISH

A Wilcoxon Signed-Ranks Test indicated that the English Quantificational score was not significantly higher than the English Referential Score, $Z = 1.44$, $p < 0.15$ (Table 3). This indicated that the bilingual children did not exhibit QA in English.

### QA IN MANDARIN

A Wilcoxon Signed-Ranks Test indicated that the Mandarin Quantificational score was not significantly higher than the Mandarin Referential Score, $Z = 1.33$, $p < 0.18$ (Table 3). This indicated that the bilingual children did not show improvement in the Quantificational Condition relative to the Referential Condition and therefore did not exhibit QA in Mandarin.

| | No. of | Percent | Z | p-level |
|---|---|---|---|---|
| **E Referential & E Reflexive** | 11 | 90.90909 | 2.412091 | 0.015861 |
| **M referential & M reflexive** | 10 | 80.00000 | 1.581139 | 0.113846 |
| **E Referential & E Quan** | 12 | 75.00000 | 1.443376 | 0.148915 |
| **M referential & M Quan** | 9 | 77.77778 | 1.333333 | 0.182422 |

Table 3. Comparisons between English and Mandarin Pronoun Conditions (Quantificational, Referential, and Reflexive). (* = significant at $p<.05$)

## Study Question 2: Cross-Linguistic Transfer

Correlational analyses were conducted to examine the presence of cross-linguistic transfer between Mandarin and English (See Table 4). There was no correlation between the Mandarin Quantificational and English Quantificational Conditions, $r(13)= 0.52$, $p<0.07$, although the p level was approaching significance. There was no correlation between Mandarin Referential and English Referential Conditions, $r(13)= 0.35$, $p<0.24$. However, there was a significant correlation between Mandarin Reflexive and English Reflexive Conditions, $r(13)= 0.86$, $p < 0.0001$.

| Variables | r(X,Y) | $r^2$ | t | p | N |
|---|---|---|---|---|---|
| E Quan and M Quan | 0.523178 | 0.273715 | 2.036067 | 0.066553 | 13 |
| E Referential and M Referential | 0.347454 | 0.120724 | 1.228939 | 0.244736 | 13 |
| E Reflexive and M Reflexive | 0.861324 | 0.741879 | 5.622777 | 0.000155* | 13 |

Table 4. Correlations between English and Mandarin Pronoun Conditions (Quantificational, Referential, and Reflexive). (* = significant at $p<.05$)

## Study Question 3: *Age and Use*

Additional analyses were conducted to examine correlations between age, English use, Mandarin use, English proficiency, Mandarin proficiency, and English performance (in all four conditions—quantificational, referential, reflexive, and filler conditions). Results showed only one significant correlation, betweenage and the English reflexive condition, $r(13)=0.74$, $p<0.0039$ (See Table 5 and Table 6). Correlational analyses were conducted between age, English use, Mandarin use, English proficiency, Mandarin proficiencyand Mandarin performance (in all four conditions—quantificational, referential, reflexive, and control group). Again results showed only one significant correlation, between age and the Mandarin control condition, $r(13)=0.73$, $p<0.0044$.

| **Variables** | **r(X,Y)** | **$r^2$** | **t** | **p** | **N** |
|---|---|---|---|---|---|
| Age and E Quan | -0.062089 | 0.003855 | -0.20632 | 0.840307 | 13 |
| Age and E Referential | 0.084662 | 0.007168 | 0.28180 | 0.783325 | 13 |
| Age and E Reflexive | 0.738851 | 0.545901 | 3.63645 | 0.003912* | 13 |
| Age and E Control | 0.501930 | 0.251934 | 1.92473 | 0.080504 | 13 |
| E Use and E Quan | 0.096533 | 0.009319 | 0.32167 | 0.753736 | 13 |
| E Use and E Referential | -0.094360 | 0.008904 | -0.31436 | 0.759129 | 13 |
| E Use and E Reflexive | 0.131590 | 0.017316 | 0.44026 | 0.668273 | 13 |
| E Use and E Control | 0.478480 | 0.228943 | 1.80725 | 0.098122 | 13 |
| E Proficiency and E Quan | 0.074998 | 0.005625 | 0.24944 | 0.807615 | 13 |
| E Proficiency and E Referential | -0.151388 | 0.022918 | -0.50795 | 0.621518 | 13 |
| E Proficiency and E Reflexive | 0.201127 | 0.040452 | 0.68098 | 0.509966 | 13 |
| E Proficiency and E Control | 0.425423 | 0.180984 | 1.55909 | 0.147264 | 13 |
| M Proficiency and E Quan | 0.290283 | 0.084264 | 1.00608 | 0.335996 | 13 |
| M Proficiency and E Referential | 0.279140 | 0.077919 | 0.96413 | 0.355699 | 13 |
| M Proficiency and E Reflexive | 0.135820 | 0.018447 | 0.45468 | 0.658183 | 13 |
| M Proficiency and E Control | -0.380177 | 0.144535 | -1.36327 | 0.200050 | 13 |

Table 5. Correlations between age, English use, Mandarin use, English proficiency, Mandarin proficiency, to the variable of English performance of pronouns. (* = significant at $p<.05$)

| Variables | r(X,Y) | $r^2$ | t | p | N |
|---|---|---|---|---|---|
| Age and M Quan | 0.154258 | 0.023795 | 0.517812 | 0.614844 | 13 |
| Age and M Referential | -0.060925 | 0.003712 | -0.202440 | 0.843268 | 13 |
| Age and M Reflexive | 0.398527 | 0.158824 | 1.441153 | 0.177396 | 13 |
| Age and M Control | 0.732323 | 0.536297 | 3.566801 | 0.004420* | 13 |
| E Use and M Quan | 0.455729 | 0.207689 | 1.698067 | 0.117569 | 13 |
| E Use and M Referential | 0.174574 | 0.030476 | 0.588027 | 0.568390 | 13 |
| E Use and M Reflexive | 0.089856 | 0.008074 | 0.299227 | 0.770344 | 13 |
| E Use and M Control | 0.315951 | 0.099825 | 1.104468 | 0.292964 | 13 |
| E Proficiency and M Quan | 0.465632 | 0.216813 | 1.745044 | 0.108811 | 13 |
| E Proficiency and M Referential | 0.314757 | 0.099072 | 1.099834 | 0.294892 | 13 |
| E Proficiency and M Reflexive | -0.001646 | 0.000003 | -0.005460 | 0.995741 | 13 |
| E Proficiency and M Control | 0.288562 | 0.083268 | 0.999574 | 0.338998 | 13 |
| M Proficiency and M Quan | -0.203924 | 0.041585 | -0.690855 | 0.503974 | 13 |
| M Proficiency and M Referential | -0.009172 | 0.000084 | -0.030420 | 0.976277 | 13 |
| M Proficiency and M Reflexive | -0.068851 | 0.004740 | -0.228896 | 0.823150 | 13 |
| M Proficiency and M Control | -0.079221 | 0.006276 | -0.263574 | 0.796981 | 13 |

Table 6. Correlations between age, English use, Mandarin use, English proficiency, Mandarin proficiency, to the variables of Mandarin performance of pronouns. (* = significant at $p<.05$)

Given the potential influence of age on English and Mandarin task performance, additional correlations were conducted between the English and Mandarin pronoun conditions while controlling for age. These partial correlations indicated that the correlation became even stronger between English reflexive and Mandarin reflexive conditions, $r(13)=0.92$, $p<0.000027$ (See Table 7). Partial correlations between English

and Mandarin Quantificational Conditions, controlling for age, did not yield a significant correlation, $r(13)=0.54$, $p<0.07$, but was approaching significance. Partial correlations between English and Mandarin Referential Conditions, controlling for age, did not yield any significant correlations, $r(13)=0.35$, $p<0.26$. Therefore, even controlling for age, the correlation between Mandarin and English Reflexive Conditions were strong and indicated the presence of cross-linguistic transfer of the knowledge of Mandarin and English reflexives, and the correlation between English and Mandarin Quantificational conditions was also approaching significance.

| Variables | r(X,Y) | $r^2$ | t | df | p | N |
|---|---|---|---|---|---|---|
| E Reflexive to M Reflexive | 0.917204 | 0.841263 | 7.279934 | 10 | 0.000027* | 13 |
| E Quantificational to M Quantificational | 0.540252 | 0.291872 | 2.030207 | 10 | 0.069780 | 13 |
| E Referential to M Referential | 0.354541 | 0.125699 | 1.199045 | 10 | 0.258151 | 13 |

Table 7. Partial Correlations (controlling for age) between Mandarin and English Reflexive, Quantificational, and Referential Conditions. (* = significant at $p<.05$)

# DISCUSSION

The present study investigated whether or not bilingual English-Mandarin children would exhibit DPBE and QA in English and Mandarin. Building upon this, the study investigated whether or not these children showed similarities or differences in comparison to documented patterns in the monolingual literature. The present study also investigated whether or not these bilingual children would show cross-linguistic transfer of the development of pronouns. The study found that similar to monolingual peers, bilingual English-Mandarin children showed DPBE in English and also no DPBE and no QA in Mandarin. The study also found that age was significantly correlated with the English reflexive condition andthat there was cross-linguistic correlations between English and Mandarin reflexive pronouns, and even when age was factored out, this effect was robust. There were no correlations between Mandarin/English use and any of the pronoun conditions.

## Evidence for Both Separate Development and Interdependent Hypotheses

The present study found that the bilingual English-Mandarin children both resembled and differed from monolinguals, providing support for both the Separate Development Hypothesis and Interdependent Hypothesis. The study supported the Separate Development Hypothesis in that the bilingual children somewhat resembled monolinguals in that in English, they showed the DPBE, but not QA (Qi et al., 2006; Qi, 2010; Oshima-Tankane, 1992; Brown, 1973; Huxley, 1970; Clark, 1978; Chiat, 1986). Note that the English quantification condition (M accuracy =80.8%, SD=19.5) was numerically higher than the English referential condition (M accuracy = 65.4%, SD=22.3), suggesting that with a large sample and smaller standard deviation, this

difference may become significant. In Mandarin, they showed neither the DPBE nor the QA and resembled monolingual Mandarin children as they do not exhibit QA or DPBE (Tseng; 1987; Hsu, 1987; Erbaugh; 1992; Xu & Min, 1992; Qi et al., 2006; Qi, 2010). This finding that bilingual children resemble their monolingual counterparts is consistent with previous research done on pronoun development in another bilingual Mandarin-English child (Qi et al., 2006; Qi, 2010). This study also gave support for the Interdependent Hypothesis in that there was a significant cross-linguistic correlation between English and Mandarin reflexives, suggesting transfer between English and Mandarin in this aspect of grammatical learning. Even when controlling for age, the correlation was robust. This finding was consistent with previous studies like that of Al Kafri (2013) and other researchers (Grosjean & Li, 2012). Both the Separate Development and Interdependent Hypotheses seem to hold true for different aspects of pronoun development in bilingual children.

## Age, Use and Pronoun Development

Age was related to comprehension of the English reflexive pronouns. But language use was not related to any of the Pronoun conditions. This is surprising as more input/use should have been correlated with an increasing accuracy on pronoun usage (Weinreich, 2011; Mackey, 2000; Chien & Wexler, 1991; Grosjean & Li, 2012). It was expected that as children get more input and experience, they will activate more and more principles of language. However, it is possible that the usage measure did not reflect cumulative usage, but children's current usage. It is also possible that some of the children may have recently underwent a big change in language usage as a result of starting English-only daycares or taking English-only private music lessons. Instead, age showed to be a much better measure of the cumulative amount of English exposure and

was therefore partialed out of the correlational analyses between English/Mandarin pronoun conditions.

## Limitations

There were several limitations to the study, most notably the small sample size (*n*=13). The small sample size may have been the reason why only some relationships between variables approached significance, such as the relationship between the English and Mandarin Quantificational Conditions and the relationship between the English Quantificational and Referential Conditions. After all, it was expected under the Separate Development Hypothesis that the children would exhibit QA in English. However, the data did not show that there was a QA in English, although the relationship was approaching statistical significance. Therefore, the effect may emerge given a greater sample size.

## Future Directions

Given that the main issue with assessing language in bilingual children is the lack of clinically useful assessments (Bedore & Pena, 2008), a future direction for the study could be to include pronoun development on a bilingual language test for Mandarin-English children to determine their language abilities. The study suggested some trends to expect in the pronoun development of typically developing bilingual children, in that they might closely resemble that of their monolingual peers. Future research can confirm or reject this finding and provide more useful information for the development of a bilingual English-Mandarin test that speech-language pathologists can use to make an accurate diagnosis as to whether or not a bilingual Mandarin-English child has a language impairment..

## Implications

The implications of this study are that it is one of the first investigations of pronoun development in Chinese-English children. These findings would also be useful in clinical practice, as a speech-language pathologist can get a greater sense of what a Chinese-English child's pronoun development will be like. It is also noteworthy that in general, Chinese-English bilingual children tend to have pronoun development that resembles monolingual development. In the event that a bilingual child does not, for example, show the development of referential pronouns in Mandarin like their monolingual peers do, this may be an indication of language impairment. Therefore, this study lays groundwork for future bilingual language research.

# Appendix A: Parent Questionnaire

## Parent Questionnaire

In this questionnaire, we are specific about the different dialects of the Chinese language, such as Mandarin, Cantonese, Shanghaiese, Taiwanese, etc. Please indicate the dialect whenever applicable.

回答问卷时, 请您尽量区分汉语的各种方言, 例如普通话, 粤语, 上海话, 台语等。

**I. General Background/生活背景**

Child's name/孩子姓名_____ DOB/出生年月日_____

Sex/性别_____

Child's birthplace/出生地_____ Date arriving in the US/到达美国日期 _____

Grade/年级: Daycare/托儿所 Preschool/幼儿园 Kindergarten/学前班 1/一年级 2/二年级 3/三年级 4/四年级

Name of informant/填表人姓名_____ Relationship to child/与被试儿童的关系 _____

Mother's name/母亲姓名_____, Age/年龄____, Birthplace/出生地_____,

Dialect/所持方言_____, Date arriving in the U.S./到达美国日期_____.

Father's name/父亲姓名_____, Age/年龄____, Birthplace/出生地_____,

Dialect/所持方言_____, Date arriving in the U.S./到达美国日期_____.

Years of education/受教育年限: father/父亲_____ mother/母亲 _____

Present Occupation/目前职业: father/父亲_____ mother/母亲_____

How well do you read and write English? Please circle one./请圈出以下符合您的英文读写能力的选项:

Father/父亲: excellent/优秀 good/良好 fair/一般 poor/较差 not at all/不具备该能力

Mother/母亲: excellent/优秀 good/良好 fair/一般 poor/较差 not at all/不具备该能力

Is the child an only child?/孩子是独生子女吗? Yes/是__ No/否__

If not, please list the name and birthdate of the child's siblings:/如答案为否，请列出兄弟姐妹的姓名及生日:

_____

What other people does your household include?/是否有其他家庭成员与你们同住?

Relationship/关系_____, Age/年龄___, Dialect Spoken/所持方言_____

Relationship/关系_____, Age/年龄___, Dialect Spoken/所持方言_____

Relationship/关系_____, Age/年龄___, Dialect Spoken/所持方言_____

Has your child ever lived outside the U.S. for more than three months at a time?/孩子是否在美国之外的地方居住过三个月以上? Yes/是__ No/否__. If yes, where, when, and for how long?/如果答案为是, 请注明时间, 地点, 及持续时间。

_____

**II. Language Environment/语言环境**

What is the primary language/dialect (language used more than 75% of the time) of communication between you and your spouse at home?/您和您的配偶在家交谈通常(75%以上的时间)用何种语言/方言?_____

What is the primary language/dialect of communication in your household?/您的家庭成员之间交谈通常(75%以上的时间)用何种语言/方言?_____

Has you child ever been enrolled in a Chinese language school?/您的孩子是否上过中文语言学校？Yes/是__ No/否__.

If yes, please indicate the following/如果答案为是, 请注明:

Name of school/学校名称_____ Location/地点 _____ Date enrolled/上学日期 _____

Has your child ever been enrolled in a bilingual school?/您的孩子是否上过中英文双语学校？Yes/是__ No/否__.

If yes, please indicate the following/如果答案为是, 请注明:

Name of school/学校名称_____ Location/地点 _____ Date enrolled/上学日期 _____

Has your child ever been enrolled in an English language school?/您的孩子是否上过英文语言学校? Yes/是__ No/否__.

If yes, please indicate the following/如果答案为是, 请注明:

Name of school/学校名称_____ Location/地点 _____ Date enrolled/上学日期 _____

Has your child ever been enrolled in an ESL (English as a second language) school?/您的孩子是否上过英语作为第二语言的语言学校? Yes/是__ No/否__. If yes, please indicate the following/如果答案为是, 请注明:

Name of school/学校名称_____ Location/地点 _____ Date enrolled/上学日期 _____

Your child watches English TV and videos/您的孩子看英文电视或录像节目的频率为:

very often/经常 __ sometimes/有时 __ occasionally/偶尔 __ never/从不 __

Your child watches Chinese TV or videos您的孩子看中文电视或录像节目的频率为:

very often/经常 __ sometimes/有时 __ occasionally/偶尔 __ never/从不 __

You and other family members read English books with your child您或您的家庭成员跟孩子阅读英文书籍的频率为:

very often/经常 __ sometimes/有时 __ occasionally/偶尔 __ never/从不 __

You and other family members read Chinese books with your child您或您的家庭成员给孩子阅读中文书籍的频率为:

very often/经常 __ sometimes/有时 __ occasionally/偶尔 __ never/从不 __

Your child plays with other English-speaking children/您的孩子与其他说英文的孩子玩耍的频率为:

very often/经常 __ sometimes/有时 __ occasionally/偶尔 __ never/从不 __

Your child plays with other Chinese-speaking children/您的孩子与其他说中文的孩子玩耍的频率为:

very often/经常 __ sometimes/有时 __ occasionally/偶尔 __ never/从不 __

**III. Child Proficiency Rating/孩子语言熟练程度估测**

**We would like you to rate how well your child uses his or her languages. Rate the child's proficiency in each language using the following scales./请您参照以下量表给您孩子的中文和英文熟练程度分别估测。**

**Vocabulary Proficiency** refers to how often the child uses home vocabulary (e.g., food or clothing names) and academic vocabulary (e.g., science terms) in each language.
词汇水平指的是孩子用中文或英文表达日常词汇（例如食物或衣服名称）和学术词汇（例如科学术语）的频率。

*Put a check mark in the appropriate level for each language.请选择您孩子对每种语言的词汇掌握程度。*

| | How much English vocabulary does your child use from the words she/he learns at home (e.g., food, clothing) or school (e.g., science terms)? 在家里学的词汇（ 例如食物、衣服类的词）或学校里学的词汇（例如科学术语）中，您的孩子用英语表达的词汇有多少？ | How much Mandarin vocabulary does your child use from the words she/he learns at home (e.g., food, clothing) or school (e.g., science terms)? 在家里学的词汇（ 例如食物、衣服类的词）或学校里学的词汇（例如科学术语）中，您的孩子用汉语表达的词汇有多少？ |
|---|---|---|
| 0. | Does not speak in the indicated language./不能用英语表达 | Does not speak in the indicated language./不能用汉语表达 |
| 1. | A few words/几个英文词 | A few words/ 几个中文词 |
| 2. | A limited range of words/ 有限范围内的英文词 | A limited range of words/ 有限范围内的中文词 |
| 3. | Some words / 一些英文词 | Some words / 一些中文词 |
| 4. | Many words/ 很多英文词 | Many words/ 很多中文词 |
| 5. | Extensive vocabulary/ 英文词汇量很大 | Extensive vocabulary/ 中文词汇量很大 |
| | DK- Do not know/不知道 | DK- Do not know。不知道 |

**Speech Proficiency** refers to how easily the child can be understood in each language.

发音水平指的是孩子周围的人是否能听懂孩子说话。

*Check the indicated for each language in the table below. 请在每种语言下标出符合您孩子情况的选项。*

| | How often can you understand your child's speech in English? Difficulties in this area might be noted when a child mispronounces a sound such a /r/ or /s/, a cluster of sounds (e.g., /sk/) or omits part of a word (e.g., says "evator" for "elevator")<br>您多大程度上能听懂您孩子的英文？下列情况有可能对听者造成困难：例如孩子不能正确发出 /r/ 或 /s/音, 不能连续发出两个辅音(如 /sk/)，或漏掉单词中的部分音素(例如把"elevator" 说成"evator")。 | How often can you understand your child's speech in Mandarin? Difficulties in this area might be noted when a child mispronounces a sound such a /n/ or /l/, or omits part of a word.<br>您多大程度上能听懂您孩子的中文？下列情况有可能对听者造成困难：例如孩子不能正确发出 /z, ch, sh/ 或 /r/的音，或漏掉单词中的部分音素(例如把说成 "花蝴蝶"说成"花蝶")。 |
|---|---|---|
| 0- | Does not speak in the indicated language./不能用英语表达 | Does not speak in the indicated language./不能用汉语表达 |
| 1- | Never/完全听不懂 | Never/完全听不懂 |
| 2- | Rarely/很少能听懂 | Rarely/很少能听懂 |
| 3- | Sometimes/有时能听懂 | Sometimes/有时能听懂 |
| 4- | Very often/经常能听懂 | Very often/经常能听懂 |
| 5- | Always/都能听懂 | Always/都能听懂 |
| | DK- Do not know/不知道 | DK- Do not know/不知道 |

**Sentence Production Proficiency** refers to the usual length of the child's sentences when he or she is conversing, responding in class, or telling a story.

**句子水平** 指的是孩子在对话、回答课堂问题或讲故事中所包含句子的一般长度。

*Put a check mark in the level for each language. 请选择您孩子对每种语言的句子运用程度。*

| | How long are your child's sentences in English | How long are your child's sentences in Mandarin |
|---|---|---|

| | | |
|---|---|---|
| | typically? (Remember that children commonly use sentences of a certain length but regularly use sentences that are shorter when they are answering a question such as "Would you like a cookie?" or longer than the usual length)<br>一般情况下您孩子说多长的英文句子？（请注意：孩子通常用一定长度的句子，但在回答例如"你想吃曲奇饼么？"这样的问题时会很简短，而在回答另外一些问题的时候所用句子会比通常情况长一些。） | typically? (Remember that children commonly use sentences of a certain length but regularly use sentences that are shorter when they are answering a question such as "Would you like a cookie?" or longer than the usual length.)<br>一般情况下您孩子说多长的中文句子？（请注意：孩子通常用一定长度的句子，但在回答例如"你想吃曲奇饼么？"这样的问题时会很简短，而在回答另外一些问题的时候所用句子会比通常情况长一些。） |
| 0- | Does not speak in the indicated language. /不能用英语表达 | Does not speak in the indicated language. /不能用汉语表达 |
| 1- | 1-2 words/1到2个词 | 1-2 words/1到2个词 |
| 2- | 2-3 words/2到3个词 | 2-3 words/2到3个词 |
| 3- | 3-4 words/3到4个词 | 3-4 words/3到4个词 |
| 4- | 4-5 words/4到5个词 | 4-5 words/4到5个词 |
| 5- | 5 or more words/5 个词以上 | 5 or more words/5 个词以上 |
| | DK- Do not know/不知道 | DK- Do not know/不知道 |

**Grammatical proficiency** refers to the grammatical acceptability.

**语法水平**指的是语法使用的正确性。

*Put a check mark in the level for each language. 请在每种语言下标出符合您孩子情况的选项。*

| | | |
|---|---|---|
| | **How often does your child produce well formed sentences in English when conversing or telling stories?** Some forms that may be difficult in English are past tense forms (e.g., walked) or present tense forms (e.g., walks).<br>在您孩子用英语交谈或讲故事时，他/她在 | **How often does your child produce well formed sentences in Mandarin when conversing or telling stories?** In Mandarin, children might have trouble with grammatical markers indicating the completion or ongoing status of activities.<br>在您孩子用汉语交谈或讲故事时，他/她在多 |

| | | |
|---|---|---|
| | 多大程度上能运用合乎语法的句子？例如，孩子可能不能正确运用动词过去时形式（例如walked）或动词现在时形式（例如walks）。 | 大程度上能运用合乎语法的句子？例如，孩子可能会省略表达进行体或完成体的语法元素“妈妈很忙，妈妈洗衣服”（正确形式为“妈妈**在**洗衣服”），“宝宝吃饭了”（正确形式为“宝宝吃**完**饭了”）。 |
| 0- | Does not speak in the indicated language. 不能用英语表达 | Does not speak in the indicated language. 不能用汉语表达 |
| 1- | Never/从来不能 | Never/从来不能 |
| 2- | Rarely/很少能 | Rarely/很少能 |
| 3- | Sometimes/有时能 | Sometimes/有时能 |
| 4- | Very often/ 经常能 | Very often/经常能 |
| 5- | Always/总是能 | Always/总是能 |
| | DK- Do not know/不知道 | DK- Do not know/不知道 |

**Comprehension Proficiency** refers to how easily the child understands each language.

**理解水平**指的是孩子对每种语言的理解程度

*Put a check mark in the level for each language. 请在每种语言下标出符合您孩子情况的选项*

| | | |
|---|---|---|
| | **How often does your child understand what is said in English?** Difficulties in this area might be noted when she/he frequently asks for repetition or only attends to part of what you say (e.g., last part of a story, one part of a series of instructions).<br>您的孩子多大程度上能听懂别人说的英文？对英文话语理解有困难的行为包括：孩子经常要求您重复已经说过的话，孩子经常只听懂了一句话的前半句或后半句。 | **How often does your child understand what is said in Mandarin?** Difficulties in this area might be noted when she/he frequently asks for repetition or only attends to part of what you say (e.g., last part of a story, one part of a series of instructions).<br>您的孩子多大程度上能听懂别人说的中文？对中文话语理解有困难的行为包括：孩子经常要求您重复已经说过的话，孩子经常只听懂了一句话的前半句或后半句。 |
| 0. | Does not understand the indicated language. 不能用英语表达 | Does not understand the indicated language. 不能用汉语表达 |

| | | |
|---|---|---|
| 1. | Never/从来不能 | Never/从来不能 |
| 2. | Rarely/很少能 | Rarely/很少能 |
| 3. | Sometimes/有时能 | Sometimes/有时能 |
| 4. | Very often/经常能 | Very often/经常能 |
| 5. | Always/总是能 | Always/总是能 |
| | DK- Do not know/不知道 | DK- Do not know/不知道 |

**Are you concerned about the way your child talks?/您对孩子的语言表达能力有担心或忧虑吗？**

**Yes /有 No/没有**

**If yes, please describe your concern. /如果答案为有，请描述您的忧虑。**

**We know that your child is exposed to English and Chinese. How important is it to you that your child be bilingual?/您孩子的成长在中英文环境下。您的孩子能否成为双语儿童对您来说：**

**Very important/很重要 Somewhat important/有一些重要 Not at all important/一点也不重要**

**IV. Language Use/语言使用 (this section will be conducted in a face-to-face interview/这部分将采用访谈形式)**

| Ages | At home | | At School/Preschool/Daycare |
|---|---|---|---|
| 0-1 | Mandarin, English, Both | + | Mandarin, English, Both, NA |
| 1-2 | Mandarin, English, Both | + | Mandarin, English, Both, NA |
| 2-3 | Mandarin, English, Both | + | Mandarin, English, Both, NA |
| 3-4 | Mandarin, English, Both | + | Mandarin, English, Both, NA |
| 4-5 | Mandarin, English, Both | + | Mandarin, English, Both, NA |
| 5-6 | Mandarin, English, Both | + | Mandarin, English, Both, NA |
| 6-7 | Mandarin, English, Both | + | Mandarin, English, Both, NA |
| 7-8 | Mandarin, English, Both | + | Mandarin, English, Both, NA |
| 8-9 | Mandarin, English, Both | + | Mandarin, English, Both, NA |
| 9-10 | Mandarin, English, Both + | | Mandarin, English, Both, NA |

**Home Language Profile/在家使用语言记录: During Week/工作日 (This should be done over for each interview/这部分)**

| Time/时间 | Activity/活动 | Participants/参与者 | Language(s)/使用语言 | |
|---|---|---|---|---|
| | | | Participant INPUT/参与者 | Child OUTPUT/孩子 |
| 7am | | | M E B | M E B |
| 8am | | | M E B | M E B |
| 9am | | | M E B | M E B |
| 10am | | | M E B | M E B |
| 11am | | | M E B | M E B |
| 12pm | | | M E B | M E B |
| 1pm | | | M E B | M E B |
| 2pm | | | M E B | M E B |

| | | | | |
|---|---|---|---|---|
| 3pm | | | M E B | M E B |
| 4pm | | | M E B | M E B |
| 5pm | | | M E B | M E B |
| 6pm | | | M E B | M E B |
| 7pm | | | M E B | M E B |
| 8pm | | | M E B | M E B |
| 9pm | | | M E B | M E B |
| 10pm | | | M E B | M E B |
| 11pm | | | M E B | M E B |

**Directions**: For activity, include what the child is engaged in (e.g., breakfast, play, etc). For participants, include who is interacting with the child in the given activity (e.g., mother, grandfather, siblings, etc.). For language(s), use M for Mandarin, E for English, B for Both.

**说明:** 活动包括孩子做的事情（例如吃早餐，玩游戏等）。参与者包括和孩子一起做事情的人（例如母亲，爷爷，兄妹等）。使用语言包括汉语（M），英语（E），汉语和英语（B）。

**Home Language Profile/在家使用语言纪录: Weekend/周末**

| **Time/时间** | **Activity/活动** | **Participants/参与者** | **Language(s)/语言使用** | |
|---|---|---|---|---|
| | | | **Participant INPUT/参与者** | **Child OUTPUT/孩子** |
| 7am | | | M E B | M E B |
| 8am | | | M E B | M E B |
| 9am | | | M E B | M E B |
| 10am | | | M E B | M E B |
| 11am | | | M E B | M E B |
| 12pm | | | M E B | M E B |
| 1pm | | | M E B | M E B |

| | | | | |
|---|---|---|---|---|
| 2pm | | | M E B | M E B |
| 3pm | | | M E B | M E B |
| 4pm | | | M E B | M E B |
| 5pm | | | M E B | M E B |
| 6pm | | | M E B | M E B |
| 7pm | | | M E B | M E B |
| 8pm | | | M E B | M E B |
| 9pm | | | M E B | M E B |
| 10pm | | | M E B | M E B |
| 11pm | | | M E B | M E B |

**Directions**: For activity, include what the child is engaged in (e.g., breakfast, play, etc). For participants, include who is interacting with the child in the given activity (e.g., mother, grandfather, siblings, etc.). For language(s), use M for 汉语, E for 英语, B for 汉语和英语

**说明:** 活动包括孩子做的事情（例如吃早餐，玩游戏等）。参与者包括和孩子一起做事情的人（例如母亲，祖父，兄妹等）。使用语言包括汉语（M），英语（E），汉语和英语（B）。

# Appendix B: Pronoun Test Items

**Bilingual Test - English Test**

Research Design: 4 warm-ups, 8 fillers, 24 test items (8 pronouns, 8 quantificationals, 8 reflexives)
Within-subject design

**The Picture-Selection Task**

**3 warm-ups:**
Look, this is an elephant. (A)
Look, this is a strawberry. (B)
Look, the boy is diving. (A)

**8 fillers:**
Look, the sheep is painting the elephant. (A)
Look, the reindeer is shaving the kangaroo. (B)
Look, the horse is combing the camel. (A)
Look, the rabbit is biting the camel. (B)
Look, the dog is wiping the hedgehog. (A)
Look, the monkey is washing the hippo. (B)
Look, the cow is cutting the donkey. (A)
Look, the giraffe is doodling the horse. (B)

**24 test items:**

**8 Pronoun test items:**
1. Look, the cat is hitting him. (A)
2. Look, the rabbit is patting her. (B)
3. Look, the boy is tickling him. (B)
4. Look, the mouse is touching her. (A)
5. Look, the dog is spraying him. (A)
6. Look, the girl is tying her. (B)
7. Look, the boy is scratching him. (B)
8. Look, the girl is pointing at her. (A)

**8 Quantificational test items:**
1. Look, every cat is hitting him. (A)
2. Look, every rabbit is patting her. (B)
3. Look, every boy is tickling him. (B)
4. Look, every mouse is touching her. (A)

5. Look, every dog is spraying him. (A)
6. Look, every girl is tying her. (B)
7. Look, every boy is scratching him. (B)
8. Look, every girl is pointing at her. (A)

**8 Reflexive test items:**
1. Look, the cat is hitting himself. (B)
2. Look, the rabbit is patting herself. (A)
3. Look, the boy is tickling himself. (A)
4. Look, the mouse is touching herself. (B)
5. Look, the dog is spraying himself. (B)
6. Look, the girl is tying herself. (A)
7. Look, the boy is scratching himself. (A)
8. Look, the girl is pointing at herself. (B)

**Bilingual Test - Mandarin Test:**

Research Design: 4 warm-ups, 8 fillers, 24 test items (8 pronouns, 8 quantificationals, 8 reflexives)
Within subject design

**The Picture Selection Task**

**3 Warm-ups:**
1. 你看，这是葡萄。(B)
2. 你看，这是小女孩。(A)
3. 你看，小女孩在骑自行车。(B)

**8 Fillers:**
1. 你看，小猪在画小熊。(A)
2. 你看，小松鼠在刮小兔子。(B)
3. 你看，小袋鼠在梳小猴子。 (A)
4. 你看，小猴子在咬长颈鹿。 (B)
5. 你看，小恐龙在擦小牛。 (A)
6. 你看，小女孩在洗小鹿。(B)
7. 你看，小兔子在剪小猫。(A)
8. 你看，小象在涂小猫。(B)

**24 test items:**

**8 Pronoun test items:**

1. 你看，小企鹅在打他。(A)
2. 你看，小女孩在拍她。(B)
3. 你看，小猴子在挠他。(B)
4. 你看，小女孩在摸她。(A)
5. 你看，小男孩在冲他。(A)
6. 你看，小刺猬在捆她。(B)
7. 你看，小熊在指他。(B)
8. 你看，小猫在抓她。(A)

**8 Quantificational test items:**

1. 你看，每只小企鹅都在打他。(A)
2. 你看，每个小女孩都在拍她。(B)
3. 你看，每只小猴子都在挠他。(B)
4. 你看，每个小女孩都在摸她。(A)
5. 你看，每个小男孩都在冲他。(A)
6. 你看，每只小刺猬都在捆她。(B)
7. 你看，每只小熊都在指他。(B)
8. 你看，每只小猫都在抓她。(A)

**8 Reflexive test items:**

1. 你看，小企鹅在打他自己。(B)
2. 你看，小女孩在拍她自己。(A)
3. 你看，小猴子在挠他自己。(A)
4. 你看，小女孩在摸她自己。(B)
5. 你看，小男孩在冲他自己。(B)
6. 你看，小刺猬在捆她自己。(A)
7. 你看，小熊在指他自己。(A)
8. 你看，小猫在抓她自己。(B)

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